

Feb. 4, 1930.

P. A. CARSON ET AL

1,745,779

HOLE CUTTER

Filed June 22, 1928

Fig 1

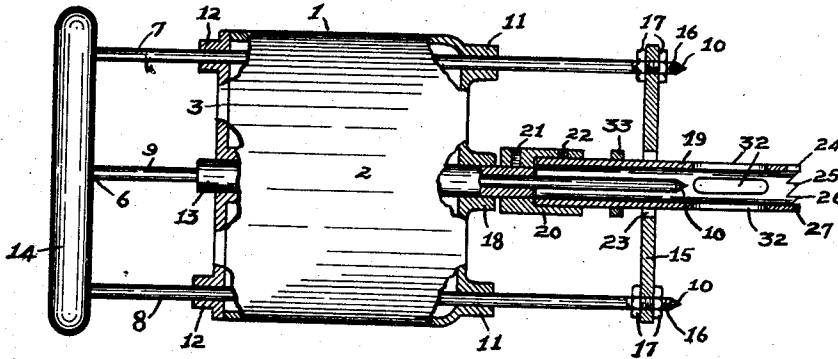


Fig 2

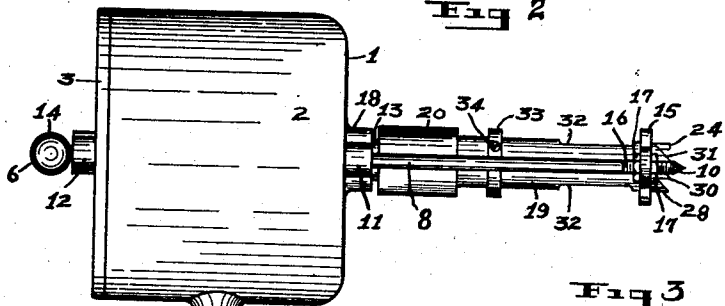


Fig 3

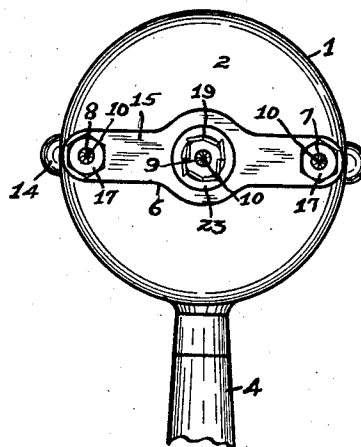
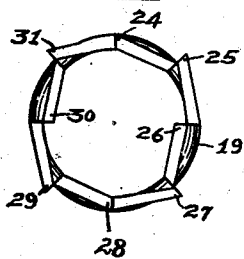


Fig 4



INVENTORS
Paul A. Carson
William Broad
By Jack Snyder
Attorney

UNITED STATES PATENT OFFICE

PAUL A. CARSON, OF PITTSBURGH, AND WILLIAM BROAD, OF BEAVER FALLS,
PENNSYLVANIA

HOLE CUTTER

Application filed June 22, 1928. Serial No. 287,434.

Our invention relates to a hole cutter particularly adapted for cutting or sawing holes in wood and other materials except metal and other very indurate materials.

5 Important objects of the invention are to provide a hole cutter of the character described, which includes a cutting member directly connected to the motor shaft to rotate with the latter, which will facilitate and expedite hole cutting operations, and which embodies a novel supporting element permitting of the engagement of the work by the device to allow high speed cutting operations at any angle.

15 Further objects of the invention are to provide a device of the class stated which is simple in its construction and arrangement, strong, compact, light in weight, durable and efficient in its use, positive in its action, conveniently operable, and comparatively inexpensive to manufacture and operate.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of the claims hereunto appended without departing from the spirit of the invention.

In the drawing wherein like numerals of reference designate corresponding parts throughout the several views:—

35 Figure 1 is a top plan view, partly in section, of a hole cutter constructed in accordance with the invention.

Figures 2 and 3 are, respectively, side elevation and front end views of the device.

40 Figure 4 is an enlarged end view of the tubular cutting member.

Referring in detail to the drawing 1 represents an electric motor including a motor housing 2 and an end plate 3 which is secured to the rear end of the latter. A motor handle 4 is fixed to and depends from the lower side of the motor housing 2 and carries the terminals of the electric current conductors 5.

50 The motor 1 is slidably mounted on a supporting frame 6. The latter comprises three

parallel disposed slide rods respectively indicated at 7, 8 and 9. The slide rods 7, 8 and 9 are identical in length and have pointed forward ends 10.

The slide rods 7 and 8 extend through the motor housing 2 adjacent to the periphery of the latter, and are diametrically opposed at respective sides of the housing 2. Each of the slide rods 7 and 8 further extends through a pair of guide bosses, indicated at 11 and 12. The bosses 11 project forwardly from the front wall of the motor housing 2, and the bosses 12 project rearwardly from the rear end plate 3.

The slide rod 9 extends longitudinally through the tubular motor shaft 13, and is disposed centrally intermediate of the associated slide rods 7 and 8. The rear ends of the slide rods 7, 8 and 9 are fixedly secured in a handle bar 14. The forward end portions of the slide rods 7 and 8 are fixedly joined together by a cross-bar 15. The forward end portions of the slide rods 7 and 8 are threaded as at 16. The cross-bar 15 is secured in position by clamping each end thereof between a pair of nuts 17, which engage each threaded end portion 16, of respective slide rods 7 and 8.

The motor shaft 13 projects forwardly from the forward motor bearing 18, and is rigidly connected to the tubular cutting member 19, by a coupling sleeve 20. The latter overlaps the adjoining ends of the projecting motor shaft 13 and the tubular cutting member 19, and is maintained in the securing position by a pair of set screws, respectively indicated at 21 and 22.

The cutting member 19 is longitudinally aligned with the motor shaft 13 and projects through a centrally disposed aperture 23 formed in the cross-bar 15.

The forward end of the tubular cutting member 19 is formed with cutting teeth, respectively indicated at 24, 25, 26, 27, 28, 29, 30 and 31. The teeth 24 and 28 are disposed on the mean circumference of the tubular cutting member 19 and are diametrically opposed with respect to each other. The teeth 26 and 30 are disposed inwardly of the circumference of the inner periphery of the cutting 100

member 19 and are diametrically opposed relatively to each other. The teeth 25, 27, 29 and 31 are disposed outwardly of the circumference of the outer periphery of the cutting member 19, and are positioned alternately between the other teeth 24, 26, 28 and 30, respectively.

The relative positions of the teeth 24, 25, 26, 27, 28, 29, 30 and 31, as above described and as clearly illustrated in Figure 4, are provided for the purpose of cutting a groove, during the hole cutting operation, that will provide ample clearance for the successful operation of a tubular cutting member 19 of the type disclosed, without liability of binding or tightening in the groove being cut. During the hole cutting operation three distinct paths of travel are cut simultaneously to exact depths.

It will, of course, be obvious that the number of cutting teeth embodied in the construction of the tubular cutting member 19, and their staggered relation with respect to each other, may be widely varied to best meet conditions found in practice, but it is essential that the arrangement be such as to provide ample clearance for the operation of the cutting member 19. The clearance provided by the latter entirely eliminates friction against the outer and inner peripheries of the tubular cutting member 19, and consequently permits of the exceptionally high speed hole cutting operations effected by the direct connection of the cutting member 19 with the motor shaft 13.

The cutting member 19 is formed with a plurality of apertures or slots 32, which are disposed adjacent to the cutting end of the cutting member 19, and provided for the escape or passage of cuttings concomitant with hole cutting operations.

A collar 33, secured by a set screw 34, is adjustably mounted on the cutting member 19 and is provided for the purpose of regulating the depths of the holes being cut.

When the motor 1 is shifted to the rearward position on the supporting frame 6, as shown in Figure 2, the forward pointed ends 10 of the slide rods 7, 8 and 9 will project slightly beyond the forward or cutting end of the cutting member 19, the slide rod 9 extending longitudinally through the latter.

In practice, the operation of our improved hole cutter is as follows:—The running motor 1 with the associated cutting member 19 is first shifted to the extreme rearward position on the supporting frame 6. The projecting pointed ends 10 of the slide rods 7, 8 and 9 are then forced into the work into which the hole is to be cut.

The operator supports the cutter by grasping the handle bar 14 with one hand, and shifts the motor 1 forwardly on the supporting frame 6 by his grasp on the motor handle 4 with the other hand, thereby feeding the

cutter member 19 into the work and readily effecting the hole cutting operation.

In cutting a hole with the tubular cutting member 19, in the manner stated, the core resulting from the hole cut, will, of course, be positioned within the cutting member 19. This core will, however, be pushed from the cutting member 19 by the slide rod 9, when the motor 1 is again shifted rearwardly on the supporting frame 6 for the subsequent hole cutting operation.

The slide rod 9 not only serves as a medium for dislodging the core from the cutting member 19, but further provides a centering agent for steadying the cutting operation of the latter and generally increasing its efficiency.

By the adjustment of the collar 33, on the cutting member 19, holes of any predetermined depth may be cut. In the event that it is not desired to cut a hole through the work, the resulting core would, of course, remain in the hole until the same is broken or cut therefrom. This latter operation may be readily accomplished by any suitable implement.

It will here be noted that the present invention is particularly adaptable for electricians or for other tradesmen whose art calls for cutting of holes that are to extend at any desired angles, for cutting holes in corners, on edges, or half round holes on surfaces, as the engagement of the supporting frame 6 within the work permits of such hole cutting operations with the greatest facility.

It will be understood that any other type of cutting member which is successfully applicable in connection with the operation of our improved hole cutter may be employed, instead of the tubular cutting member 19, as herein shown and described.

From the foregoing description, taken in connection with the accompanying drawing, the advantages of the construction and the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while describing the principle of operation of the invention together with the device providing an embodiment thereof, it is to be understood that the device shown is merely illustrative, and that various changes in the form, proportions, and details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as defined in the appended claims.

What we claim is:

1. A hole cutter of the character described comprising a supporting frame, an electric motor including a shaft shiftably mounted on said supporting frame, a tubular cutter member directly connected with the shaft of said electric motor, the forward end of said supporting frame being provided with work engaging elements, said electric motor retractable on said supporting frame to dis-

pose the forward cutting end of said tubular cutting member rearwardly of said work engaging elements, said supporting frame including a slide rod extending through the said motor shaft and through said tubular cutting member and providing a centering medium for the latter.

2. A hole cutter of the character described comprising a supporting frame, a driving element including a shaft shiftably mounted on said supporting frame, a tubular cutter member directly connected with said shaft, the forward end of said supporting frame being provided with work engaging elements, said driving element being retractable on said supporting frame to dispose the forward cutting end of said tubular cutter member rearwardly of said work engaging elements, said supporting frame including a slide rod which extends through said tubular cutter member and providing a centering medium for the latter.

In testimony whereof we affix our signatures.

PAUL A. CARSON.
WILLIAM BROAD.